

Abstract

The invention relates to a membrane-electrode assembly (MEA) for electrochemical devices, in particular for membrane fuel cells. The membrane-electrode assembly has a semi-coextensive design and comprises an ion-conducting membrane, two catalyst layers and gas diffusion layers of differing sizes on the front side and rear side. The first gas diffusion layer has smaller planar dimensions than the ion-conducting membrane, while the second gas diffusion layer has essentially the same planar dimensions as the ion-conducting membrane. As a result, the ion-conducting membrane has a surface which is not supported by a gas diffusion layer on the front side.

The membrane-electrode assembly has, owing to the particular construction, a stable structure which can be handled readily and displays advantages in the sealing of the reactive gases from one another and also in terms of the electrical properties. In particular, the hydrogen penetration current is significantly reduced.

New processes for producing the MEA of the invention are described, in particular the method of heat pulse welding.

The membrane-electrode assembly is used in PEM fuel cells, direct methanol fuel cells, electrolyzers and other electrochemical devices.